

July 7, 2010

Mr. W.S. Oxenford, Vice President
Nuclear Generation and Chief Nuclear Officer
Columbia Generating Station
Energy Northwest
MD PE08
P.O. Box 968
Richland, WA 99352

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE
COLUMBIA GENERATING STATION, LICENSE RENEWAL APPLICATION
CONCERNING STRUCTURES

Dear Mr. Oxenford:

By letter dated January 19, 2010, Energy Northwest submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew operating license NPF-21 for Columbia Generating Station, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Abbas Mostala and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-4029 or by e-mail at evelyn.gettys@nrc.gov.

Sincerely,

/RA/

Evelyn Gettys, Project Manager
Projects Branch 1
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure:
As stated

cc w/encl: See next page

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COLUMBIA GENERATING STATION
LICENSE RENEWAL APPLICATION
REQUEST FOR ADDITIONAL INFORMATION

RAI B.2.34-1

Background:

Generic Aging Lessons Learned (GALL) Report, AMP XI.S1, "ASME Section XI, Subsection IWE," Program Element 10, "operating experience," states that implementation of ASME Section XI, Subsection IWE, in accordance with 10 CFR 50.55a, is a necessary element of aging management for steel components of steel and concrete containments through the period of extended operation.

Issue:

Program Element 10 for the Columbia Generating Station (CGS) ASME Section XI, Subsection IWE aging management program (AMP) states that CGS has committed to monitor humidity levels in the sand pocket region and that a procedure to survey the relative humidity of air drawn from within the containment annulus sand pocket region has been implemented. This issue is also discussed in the Aging Management Program Evaluation Results, Inservice Inspection (ISI) Program – IWE, LRPD-05, Attachment 3.2, Revision 3, which references PPM Number: 10.24.206, Containment Annulus Sand Pocket Humidity Measurement [Reference IWE.12]. Section 6 in PPM Number: 10.24.206 defines the acceptance criteria as follows:

The acceptance criteria for this procedure is that Table 7.9a of Section 7.9 is complete and signed by Systems Engineering Staff and the Systems Engineering Manager or designee, indicating a review of test data was determined acceptable.

Procedure PPM Number: 10.24.206 does not address the following issues.

- acceptance criteria for humidity level values including limits of acceptability used by System Engineering to determine if test data are acceptable
- procedures that are followed when humidity level values do not meet acceptance criteria
- the frequency that humidity measurement data are acquired at each of the eight drain lines
- other tests, measurements, or corrective actions to be performed when humidity level values do not meet acceptance criteria

In addition, page 5 of enclosure 2 to the letter from B. Benney, NRC to J. V. Parrish, Energy Northwest, Subject: Columbia Generating Station – Issuance of Amendment RE: One-time Extension of Appendix J Type A Integrated Leakage Rate Test Interval (TAC No. MC3942) dated April 12, 2005, includes the following statement.

From the data reviewed, the worst case (maximum) dew point temperature of the sand pocket air was about 54 degrees Fahrenheit. The temperature of the containment shell in the sand pocket area is essentially the same temperature as the suppression pool water. The suppression pool water temperature is normally maintained above 54 degrees Fahrenheit.

ENCLOSURE

These data indicate that the relative humidity in the sand pocket area could be as high as 100% under certain operating conditions. Humidity of this magnitude could cause general corrosion of the outside surface of the metal containment shell in the sand pocket area.

Request:

The applicant is requested to provide details of its humidity monitoring program including the acquisition frequency of humidity measurement data, limits of acceptability for humidity level values, and follow-up actions that the applicant will take when humidity levels exceed the acceptance criteria. In addition, the applicant is requested to explain how humidity measurements acquired before and after refueling demonstrate that there is no water in the sand pocket area since it will take some time for the water to flow through the flexible urethane foam sheets located between bio-shield wall and steel containment and affect the humidity of the sand pocket region. The applicant is also requested to describe potential aging effects including loss of material resulting from exposure of the metal containment shell to humidity levels that are measured during the plant outages.

RAI B.2.34-2

Background:

GALL Report, AMP XI.S1, "ASME Section XI, Subsection IWE," Program Element 1, "scope of program," states that ASME Section XI, Subsection IWE-1000 specifies the components of steel containments and steel liners of concrete containments within its scope.

Issue:

Program Element 1 of the CGS ISI Program—IWE includes examination of pressure-retaining bolting within its scope. In addition, the GALL AMP XI.M18, Bolting Integrity aging management program follows information as delineated in NUREG-1339, published EPRI NP-5769 guidelines, and industry recommendations. NUREG-1339 recommends inspections for stress corrosion cracking (SCC) to prevent or mitigate degradation and failure of structural bolts with actual yield strength greater than 150,000 pounds per square inch.

Request:

Describe the methods that CGS is implementing to examine pressure-retaining bolting including structural bolts with actual yield strength greater than 150,000 pounds per square inch.

RAI B.2.34-3

Background:

GALL Report, AMP XI.S1, "ASME Section XI, Subsection IWE," Program Element 10, "operating experience," states that implementation of ASME Section XI, Subsection IWE, in accordance with 10 CFR 50.55a, is a necessary element of aging management for steel components of steel and concrete containments through the period of extended operation.

Issue:

Program Element 10 of the CGS ISI Program – IWE states that “suppression pool wetted surfaces of the submerged area were examined and found acceptable.” However, the applicant did not indicate whether or not repairs to the drywell shell coating or the moisture barrier were performed to achieve compliance with ASME Section XI, Subsection IWE requirements. The applicant also reported in the Containment Visual Examination Data Sheet, Report No. 3COV-26, dated June 12, 2009, the following statement:

All coated surfaces exhibited a light dusting on all surfaces, which was removed prior to the VT-3 examination. It is recommended that a complete wetwell desludge be performed prior to the next VT-3 examination on the bottom head moisture barrier.

Note 3 for ASME Section XI, Subsection IWE, Table IWE-2500-1 states that examination shall include moisture barrier materials intended to prevent intrusion of moisture against inaccessible areas of the pressure retaining metal containment shell or liner at concrete-to-metal interfaces and at metal-to-metal interfaces which are not seal-welded. Containment moisture barrier materials include caulking, flashing, and other sealants used for this application.

Request:

The applicant is requested to provide the inspection frequency for the accessible coated wetwell metal shell surface and the moisture barrier inside the wetwell at the concrete-to-metal interface. In addition, provide the details and number of all coating degradations in the drywell and wetwell, and degradation of the wetwell moisture barrier observed during the previous IWE inspections. The applicant is requested to describe how VT-3 examination of the moisture barrier and steel containment is performed without removing the sludge from the inspected surfaces.

RAI B.2.35-1

Background:

GALL Report, AMP XI.S3, “ASME Section XI, Subsection IWF,” Program Element 1, “scope of program,” imposes ISI requirements for Class 1, 2, 3, and MC piping and components and their associated supports.

Issue:

Program Element 1 for the CGS ISI Program-IWF aging management program states that the scope of the IWF program includes ASME Class 1, 2, and 3 piping supports and supports other than piping supports (Class 1, 2, 3, and MC). In LRPD-05, Attachment 3.3, Revision 3, Reference IWF.4, the applicant states that “one component in each multiple component group” is selected for examination. However, Note 3 for Table IWF-2500-1 in ASME Section XI, Subsection IWF states that for multiple components other than piping, within a system of similar design, function, and service, the support of only one of the multiple components are required to be examined.

Request:

The applicant is requested to describe the criteria used to select components for examination under its ISI Program-IWF aging management program and to ensure consistency with component selection requirements in ASME Section XI, Subsection IWF, Table IWF-2500-1.

RAI B.2.35-2

Background:

GALL Report, AMP XI.S3, "ASME Section XI, Subsection IWF," Program Element 10 "operating experience," states that implementation of ASME Section XI, Subsection IWF, in accordance with 10 CFR 50.55a, is a necessary element of aging management for steel components of steel and concrete containments through the period of extended operation.

Issue:

Program Element 10 for the CGS ISI Program-IWF AMP states the following: "The Inservice Inspection (ISI) Program – IWF will be capable of detecting and managing loss of material and cracking for ASME Class 1, 2, and 3 component supports." However, during the onsite audit walkdown, the staff observed evidence of loss of material due to corrosion in the above-water portions of structural steel supports for the spray pond ring header.

Request:

The applicant is requested to describe the inspection frequency and details of the supplemental examinations required in accordance IWF-3200 for the above-water and below-water portions of the structural steel supports for the spray pond ring header. The applicant is also requested to describe the methods used to protect the steel from corrosion, the process used to verify that the corrosion mitigation measures are effective, and the criteria used to initiate the corrective actions program.

RAI B.2.50-1

Background:

The GALL Report XI.S6, "Structures Monitoring Program," notes that for each structure/aging effect combination, the specific parameters monitored or inspected are selected to ensure that aging degradation leading to loss of intended functions will be detected and the extent of degradation determined. Parameters monitored are to be commensurate with industry codes, standards, and guidelines. ACI 349.3R-96 and ANSI/ASCE 11-90 provide an acceptable basis for selection of parameters to be monitored or inspected for concrete and steel structural components and for steel liners, joints, coatings, and waterproofing membranes.

Issue:

Program Element 3, "parameters monitored or inspected," incorporates provisions for increased monitoring described in RG 1.160. This includes clarifications under Paragraph (a)(1) of 10 CFR 50.65 and includes additional degradation-specific condition monitoring and increased frequency of assessments until ongoing corrective actions are complete and functional performance is assured. The Structures Monitoring Program identifies a recommendation to list ACI 349.3R-96 and ANSI/ASCE 11-90 as references to indicate that they provide guidance for selection of parameters monitored or inspected. The listing of these documents is provided as a recommended enhancement. The staff is unclear if the recommended enhancements are

required to meet GALL criteria or if CGS will commit to the recommended enhancements prior to the period of extended operation. The staff believes recommended enhancements listed in Section 3.2 of LRPD-05, Attachment 3.4, Revision 3 of AMP B.2.50, Structures Monitoring Program should be included in the scope of the program.

Request:

- a) Provide information to clarify the distinction between recommended enhancements and in particular describe the criteria that will be used to determine if recommendations will be implemented,
- b) Specify whether the recommended enhancements are required to meet or exceed GALL provisions (e.g., adoption of ACI 349.3R-96 acceptance criteria), and
- c) Identify whether CGS will commit to the recommended enhancements prior to the period of extended operation or, if a commitment will not be made to all recommended enhancements, identify which recommended enhancements will be adopted in each of the aging management programs.

RAI B.2.50-2

Background:

GALL Report XI.S6, "Structures Monitoring Program," notes that ACI 349.3R-96 provides an acceptable basis for developing acceptance criteria for concrete structural elements, steel liners, joints, coatings, and waterproofing membranes. The plant-specific structures monitoring programs are to contain sufficient detail on acceptance criteria to conclude that this program attribute is satisfied.

Issue:

Program Element 6, "acceptance criteria," of the CGS Masonry Wall Program, Structures Monitoring Program, and RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants Program note that inspection criteria used to assess the condition of structures and structural components are found in the structures inspection checklist. A review of referenced program basis documents SYS-4-22, "Maintenance Rule Program (Major Revision 001)," and SYS-4-23, "Maintenance Rule Structural Baseline Inspections (Revision 0)," did not identify information related to acceptance criteria in either document. Program basis document SMP.11, "Columbia Maintenance Rule Structural Inspection Checklist," provides only a listing of conditions to check related to the concrete, masonry walls, structural steel, liner plate, roof systems, siding, windows/doors, earthen structures/dams, settlement, structure/seismic gap, interfaces, equipment supports, piping, tanks, cable trays/conduits, outside structures, and general. The staff is unclear what criteria are utilized to provide a basis for acceptance of the condition of the structures.

Request:

Provide the acceptance criteria utilized for the Masonry Wall, Structures Monitoring, and Inspection of Water Control Structures programs to establish whether or not corrective actions are required prior to loss of function, and provide justification that the acceptance criteria utilized for the structures and structural components meet or exceed the criteria provided in ACI 349.3R-96.

RAI B.2.50-3

Background:

GALL Report XI.S6, "Structures Monitoring Program," notes that inspector qualifications are to be commensurate with industry codes, standards, and guidelines. ACI 349.3R-96 and ANSI/ASCE 11-90 are identified as providing an acceptable basis for addressing aging effects.

Issue:

Program Element 4, "detection of aging effects," of the Masonry Wall Program, Structures Monitoring Program, and RG 1.127 Inspection of Water-Control Structures Associated with Nuclear Power Plants Program note that inspections are performed by individuals normally assigned to maintenance rule activities or if individuals are used that are not normally assigned to maintenance rule activities they are briefed prior to conduct of inspections or accompanied by a maintenance rule staff engineer. A review of referenced program basis documents SYS-4-22, "Maintenance Rule Program (Major Rev 001)," and SYS-4-23, "Maintenance Rule Structural Baseline Inspections (Revision 0)," did not identify information related to qualifications of inspection personnel. The staff is unclear how the qualifications of the inspection personnel are commensurate with those identified in industry codes, standards, and guidelines.

Request:

Provide qualification criteria of the personnel performing the inspections and demonstrate that they meet or exceed the criteria identified in industry codes, standards, and guidelines.

RAI B.2.50-4

Background:

Industry standards (e.g., ACI 349.3R-96) identified in the GALL Report Structures Monitoring Program recommends a ten-year inspection frequency for below-grade structures and structures in a controlled environment.

Issue:

Program Element 3, "parameters monitored or measured," of the Structures Monitoring Program notes that the Structures Monitoring Program procedure and the excavation procedure will be enhanced to specify that if a below-grade structural wall or structural component becomes accessible through excavation, a follow-up action is initiated for the responsible engineer to inspect the exposed surfaces for age-related degradation. Program basis document SMP.12, "Soil Excavation, Backfill and Compaction," does not reference planned or opportunistic inspections to address inaccessible areas. Also the program basis document does not contain provisions to notify the responsible engineer when a below-grade structural wall or structural component is exposed so that an inspection may be performed. The staff is unclear how aging

of inaccessible areas will be managed so that the intended functions of the structures and structural components below-grade will be maintained during the period of extended operation.

Request:

Describe how CGS will address aging of inaccessible areas of below-grade structures and structural components during the period of extended operation, consistent with industry standards for inspection.

RAI B.2.50-5

Background:

Element 10, "operating experience," notes that the Structures Monitoring Program has been effective in managing identified aging effects.

Issue:

AR 00026719 (11/09/2004) notes that when the U.S. Nuclear Regulatory Commission asked the question of how often leakage from the fuel pool liner is checked, CGS could not find any surveillances, preventive measures, or operator logs that check for this leakage. The staff is uncertain if leakage of the fuel pool is occurring and if leakage is present that it is being confined to the tell tale drains.

Request:

Provide historical data on fuel pool leakage obtained by checking the tell tale drains and note whether or not the leakage is confined to the tell tale drains. If the leakage is not confined to the tell tale drains, identify any structures or structural components potentially impacted and describe plans to assess the condition and continued functionality of potentially impacted structures and structural components, in particular when entering the renewed license operating term.

RAI B.2.50-6

Background:

Element 10, "operating experience," notes that the CGS Structures Monitoring Program has been effective in managing identified aging effects.

Issue:

During the walk down of the Spray Pond, the staff noted that there were numerous narrow cracks visible at the top of the reinforced concrete wall that went through the entire thickness of the wall. The cracks appeared to be shrinkage cracks and there was no evidence of corrosion. The staff is unclear of how conditions like this that may be identified during the renewed license operating period will be identified, evaluated and repaired, as necessary.

Request:

- a) Has this condition been identified by the Structures Monitoring Program? If so, on what date was it identified?
- b) Is this condition a potentially adverse condition that could impact Spray Pond functionality and hence would be subject to aging management during the renewed license operating period?
- c) If this condition was identified by the CGS Structures Monitoring Program, describe the results of the condition assessment and any plans to implement repairs.
- d) Describe any extent of condition concerns that may have led to more focused inspection of structures that could be similarly affected.

RAI B.2.50-7

Background:

Program Element 10, "operating experience," of the CGS Structures Monitoring Program AMP states the following:

Visual examinations conducted by the Structures Monitoring Program have found general corrosion on steel components and concrete cracking, flaking, and scaling. Some of the currently identified concrete surface conditions have existed since original construction. These conditions are the results of typical construction practices permitted by the original specifications and design criteria. They include small shrinkage cracks, minor construction joint voids, surface irregularities, and similar conditions determined to be minor degradation that did not require further evaluation. Inspected structures are in good condition and are capable of performing their design functions.

Issue:

CGS document A/R Number 00031540 dated May 24, 2005, addresses wetwell coating repair issues including observed cracks in the concrete that were estimated as being between 1/16 and 1/32 in. wide. During subsequent coating inspections it was noted that the cracks had grown in width, but not length, and the coating appears to be peeling away from the concrete creating a wider crack. It was noted that the cracks were about 1/16 in. wide and were not considered to be a concern unless the width increased to 1/8 in. or greater. The staff is unclear about what criteria were utilized to evaluate these cracks and if there are any plans to repair the cracks in the concrete.

Request:

The applicant is requested to provide the following:

- a) The acceptance criteria used to evaluate these cracks
- b) The results of any further investigations conducted to evaluate the concrete cracks described in CGS document A/R Number 00031540
- c) A description of any monitoring and trending of these cracks to ensure timely remediation of such conditions identified by the Structures Monitoring Program

Letter to W.S. Oxenford from E. Gettys dated July 7, 2010

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